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ABSTRACT

Nontraditional instructional activities are defined in this report as those based on new or unconventional forms of education, free of the constraints of time, place, or form which characterize traditional classroom instruction. The several sections of this report detail a variety of approaches to nontraditional instructional activities at Purdue University. These approaches include instructional radio, the Lafayette Television Unit, microwave television, statewide televised pharmacy seminars, live TV seminars on communications disorders, teaching forestry via TV, extension classes, evening classes, conference operations, intensive summer courses and workshops, a physics minicourse, audio-tutorial and closed circuit TV instruction in veterinary science and medicine, cooperative education programs, apprentice training programs, directed study, independent study, the advance credit examination program, and a home economics extension program. (HS)

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AN INVENTORY OF NON-TRADITIONAL INSTRUCTIONAL ACTIVITIES

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By

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and Dean of Continuing Education

HE 004453

Continuing Education Administration
PURDUE UNIVERSITY

July 1972

P R E F A C E

Any effort to compile an inventory in a complex, multi-campus institution such as Purdue University is almost certain to suffer from omission. However, to minimize this possibility, a small staff group from the Office of the Vice President and Dean of Continuing Education compiled an initial list of activities from their own knowledge. This list was then submitted to the deans of the nine academic schools of the University with the question, "Has any non-traditional activity from your school been omitted?" The results of these and subsequent inquiries was the collection of papers published in this volume. They are presented essentially as submitted with only minimal editing. Consequently, the collection involves some overlaps. Grateful appreciation is herewith extended to all those who contributed.

D. Richard Smith
Assistant to the Vice President
and Dean of Continuing Education

West Lafayette, Indiana

July 1972

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SECTION 1

SUMMARY OF NON-TRADITIONAL INSTRUCTIONAL ACTIVITIES AT PURDUE UNIVERSITY

Dr. C. H. Lawshe
Vice President and
Dean of Continuing Education

Non-traditional instructional activities are defined in this report as those based on new or unconventional forms of education, free of the constraints of time, place, or form which characterize traditional classroom instruction. They may be unconventional in any one or combination of the following ways:

- Type of Student Enrolled, such as working adults, housewives, young and old adults motivated to study independently, or others who cannot easily come to the campus or who do not wish to devote full time to classroom work.
- Location of Learning Experience, such as extension classes, field work, home study, or other off-campus programs.
- Method of Instruction, such as non-lecture or non-classroom teaching and learning methods as distinguished from those common in higher education.

Activities having these characteristics are in contrast with those utilizing such traditional methods as lecture, recitation, and laboratory, (i.e. lecture with a live formal lecturer, a discussion leader and a laboratory with one or more lab instructors present).

As Indiana's land-grant university, Purdue has long been involved in "non-traditional" activities. However, except for home economics extension, the report does not include the multitude of activities conducted by the Service.

Background. While the term "life-long learning", is relatively new, continuous learning has historically been an objective of Purdue's extension program. As the need for broadening life-long learning opportunities has become evident, the University has applied many techniques it had used for years in extension programs. University policy has historically supported

non-traditional instructional activities. President Stone in 1903 declared that two of the University's hallmark policies were:

> First - To foster closer relations with the commercial world, to the end that our instructors may be in touch with the latest progress in the industries, in order to make the technical instruction of the greatest possible value.
>
> Second - To keep the opportunities of the University within reach of the great class of young men and women of limited means to whom such training is of the greatest value.

The several sections of this report that follow detail a variety of approaches to non-traditional instructional activities at the University. They are presented in most instances, by the individual responsible for that activity. They are summarized here for reference purposes.

1. The University has offered credit courses by radio since the fall of 1969. (p. 5)

2. The University has been using television in its instructional program on the Lafayette campus since 1956, has sent programs to its regional campuses since 1962, and since 1968 has served the entire state via the Indiana Higher Education Telecommunication System. (pp. 9,12)

3. A number of televised statewide seminars originating on the Lafayette campus have served employed professionals including pharmacists, engineers, and speech correctionists. (pp. 15,17)

4. The School of Agriculture's offering of Forestry 103 via TV to the University's regional campuses has been so successful that it is now being sent to Vincennes University. (p. 19)

5. In addition to the credit and non-credit courses offered at the University's five campus locations, a large number of extension classes, both graduate and undergraduate, are offered at other locations in the state. (p. 21)

6. An impressive number of evening classes are offered on the Lafayette campus in order to serve the citizenry of the twelve county area surrounding West Lafayette. (p. 26)

7. Virtually every academic department and administrative unit on the Lafayette campus annually sponsors or participates in one or more conferences designed to keep its adult constituents abreast of new technology and information. (p. 29)

8. Intensive courses and workshops are becoming more numerous and are regarded as an important adjunct to regularly scheduled classes. (p. 31)

9. A recent development in higher education is the mini-course; the University's Department of Physics is experimenting with such courses. (p. 33)

10. The School of Veterinary Science and Medicine uses a variety of approaches in tutorial and closed circuit televised instruction. (p. 35)

11. The Department of Biological Sciences has introduced a number of teaching innovations via the audio-tutorial system, and mini-courses. (p. 38)

12. The Department of Biological Sciences has also developed a "multimedia", "tracked" approach to the teaching of introductory microbiology. (p. 40)

13. The School of Electrical Engineering has developed a unique individualized learning program using audio cassettes, video tapes, and consultants. (p. 43)

14. The Department of Animal Sciences reports that its audio-visual method benefits not only the student, but the instructor as well. (p. 48)

15. The Department of Electrical Technology has developed a learner controlled, audio-tutorial program for teaching electronic principles. (p. 50)

16. The University-Industry Co-operative Education Program allows a student to alternate periods of attendance at the University with periods of employment in government, business, or industry. (p. 57)

17. Graduates of two industrial training programs operated by General Electric at Fort Wayne may receive up to 26 hours of University credit in Mechanical Engineering Technology as recognition of program completion. (p. 60)

18. Virtually all departments in the School of Humanities, Social Science, and Education (as well as many other departments of the University) offer students the opportunity for directed individual study in areas where appropriate courses are not available. (p. 61)

19. The University has some unique independent study and correspondence study courses. (p. 63)

20. Indiana University and Purdue University have a "Guest-Host Agreement" which establishes policies and procedures whereby one institution may offer (a) undergraduate courses or programs, (b) graduate level courses, and (c) non-credit courses or programs, in facilities of the other University. (p. 64)

21. The University uses the College Level Examination Program to permit students to establish credit in specified courses. (p. 68)

22. Many of the University's departments allow entering students to establish credit for advanced work done in high school by "testing out" on examinations provided by that department. (p. 70)

23. The Span Plan administered by the Office of the Dean of Women provides information, counselling, grants, and motivation to women of all ages and educational backgrounds. (p. 71)

24. The program of the School of Home Economics is representative of the University's long time expansion program. (p. 73)

SECTION 2

INSTRUCTIONAL RADIO

Richard O. Forsythe
Director of Instructional Radio
Radio Station WBAA

Purdue University began broadcasting credit courses on Radio Station WBAA in the fall semester of 1969. Since that time, 14 different courses have been offered to approximately 5,000 students who have informally registered to monitor the broadcasts.

For the most part, courses are recorded as they are taught in regular, on-going class sections. Presentations are, of course, modified to accommodate the medium, and a radio producer is assigned to each course to handle those aspects of production. Discussion sections are kept small and are recorded in broadcast studios because of the technical problems involved in this type of production. In some instances, courses have been totally restructured for broadcast to capitalize on the advantages offered by radio presentation. A recording of each broadcast lesson is filed with the Audio-Visual Department to provide students with additional listening opportunities and some professors use these recordings for their regular classes as substitute for the traditional lecture. Procedures have also been developed to make those courses available to other educational institutions and broadcast stations.

Listeners who wish to monitor courses on WBAA may obtain syllabi and sample examinations from the Continuing Education Administration upon payment of a two dollar service charge per course. The listener who wants to establish credit must also complete a formal registration application sometime before the scheduled examination at the end of the semester. Students already enrolled in Purdue and who have paid full fees may take these tests without charge; all others must pay a $25.00 examination fee. Anyone may register as a temporary student to establish credit in a radio course except students who have either

been dropped from the University or who have already received a Purdue grade in the course. There is no penalty for failure under this system; failing grades are not recorded and the student is free either to take the examination again at a later date or to enroll and go through the course in the regular manner.

A preliminary analysis of broadcast expenses suggests that students were taught by radio for significantly less than normal University costs for a similar number of regular students. Evidence also exists to show that radio instruction is effective as well as economical. Successful radio students tended to score higher on the same examinations than successful students in regular sections of the courses. This is explained in part by studies of particular courses which show that radio students tend to have higher grade-point indexes than non-radio students.

While a number of informal listeners monitored the broadcast courses, the programs primarily served the on-campus student body. Approximately 82% of those completing radio courses were full-time Purdue students. According to counselors and department heads, the broadcasts have afforded increased scheduling because of over enrollment. Listeners are generally well pleased with the service and many part-time students report that it is the only way they can continue their education.

Enrollment by Courses and Semesters

	Number Requesting Syllabi	Number Taking Test	Number Passing Test
Fall 1969			
Elementary Psychology	132	26	20
Introductory Sociology	128	17	3
Total	260	43	23
Spring 1970			
Introduction to Philosophy	469	56	46
Elementary Psychology	463	151	56
Introductory Sociology	282	63	15
Marriage and Family Relationships	476	143	60
Radio and Television Broadcasting	179	23	13
Total	1869	436	190
Summer 1970			
Elementary Psychology	195	51	15
Marriage and Family Relationships	230	71	45
Total	425	122	60
Fall 1970			
Introductory Sociology	138	59	26
Introduction to Literature	109	37	34
Principles of Economics	100	38	27
Art Appreciation	130	86	86
Sex Education in Schools	108	47	36
Total	585	267	209
Spring 1971			
Biomedical Engineering	115	44	42
Principles of Economics	171	61	25
Drugs Use and Abuse	284	149	67
Introduction of Philosophy	223	56	42
Introductory Sociology	190	95	33
Total	983	405	209

	Number Requesting Syllabi	Number Taking Test	Number Passing Test
Summer 1971			
Introduction of Philosophy	98	18	13
Art Appreciation	90	28	28
Total	188	46	41
Fall 1971			
Drugs Use and Abuse	146	68	40
Marriage and Family Relationships	166	126	109
Elementary Psychology	130	54	17
Frontiers in the Geosciences	71	52	46
Introduction of Fiction	105	31	19
Total	618	331	231
GRAND TOTALS	4928	1650	962

SECTION 3

THE LAFAYETTE TELEVISION UNIT

J. S. Miles, Director
University Telecommunications Center

The major activity of the Purdue Television Unit is the production and distribution of instructional materials for the University on the Lafayette Campus, as well as the Regional Campuses at Indianapolis, Fort Wayne, Hammond and Westville. Over 150 new televised lessons were recorded during the year. Major activity in this area included the taping of lessons for Education 285, Education 530, Forestry and Conservation 103, Agriculture 101, General Studies 435, Agronomy 490, Nursing 320, Industrial Management 100 and Pharmacy Seminars. Over 500 live closed-circuit presentations, primarily to the Regional Campuses, were produced during the year including Electrical Engineering 500, 506, 554, and 555, Foods and Nutrition 303, Agronomy 490, and Nuclear Engineering 597. Although not part of regular Purdue class offerings, lesser uses of television were included for Audiology and Speech Science, the Life Insurance Marketing Institute, and the Computer Science Department. On-going productions not completed but begun during the 1970-71 year include a special program being produced in cooperation with the Office of Black Student Programs at Purdue and a special series being produced under a grant from the Department of Health, Education and Welfare, titled "Linguistic Training for Handicapped Children." This latter is being done in cooperation with the Wabash Education Center in Lafayette.

Over 1,500 pre-recorded tapes were played back during this year. This is an increase of about forty percent over a comparable period in the 1969-70 school year. Much of this additional playback was due to experimental work in the Electrical Engineering Department, as well as the increased use of pre-recorded materials by the Regional Campuses.

The summer of 1970 was one of the most active the Television Unit has had in a number of years. Six courses with 175

students enrolled had pre-recorded tapes distributed to them. Other special programs totaled five and were distributed to 3,271 viewers. Of primary interest during the summer was the special agricultural programs on the Indiana corn blight situation. This program, viewed by 2,500 people, was produced by the Television Unit--from "idea" to "in-the-can"--in one week's time.

The regularly scheduled courses using television in the fall of 1970 averaged 125 hours per week distributed by the Television Unit. The second semester, normally a slower period of distribution (and with the completion of several experiments during the first semester) were reduced to an average of 80 hours per week.

Over 700 items of televised instruction were distributed via the Indiana Higher Education Telecommunications System to the Regional Campuses at Fort Wayne, Hammond, Indianapolis and Westville. Several large uses of the system for distributing material from Purdue included; the distribution of an Agriculture Seminar on corn blight to over 2,500 viewers around the State; over 500 pharmacists participated in the Pharmacy Seminars distributed during the second semester; and almost 200 speech therapists took part in the special Audiology and Speech Science Seminar in the spring. These latter items were distributed not only to our Regional Campuses but to other viewing centers in Bloomington, Evansville, Jeffersonville, Kokomo, Muncie, Terre Haute, Vincennes, and Gary.

Although it is impossible, in some instances, to completely tally the number of viewers for some of the material that is distributed by Purdue University, we have been able to establish that during the fall semester of this year almost 5,200 viewers who could be accounted for were at the various reception centers for 31 different courses, 6 different seminars and continuing education series, and 7 other miscellaneous productions. Another 6,000 were included in those materials distributed during the spring semester. It could safely be assumed that almost 12,000 individuals in the State of Indiana had the opportunity to view materials that were distributed

from the Purdue Television Unit in the 1970-71 school year.

During the year some 40 different courses were using television for some portion of their instruction. Sixteen seminars and continuing education courses were distributed, and eight miscellaneous offerings were produced.

Work completed during the 1970-71 year and new projects which were begun, plus other contacts with academic departments who are interested in using television, indicate an expanded television use for the 1971-72 school year.

SECTION 4

PURDUE AND MICROWAVE TELEVISION

Raymond E. Wolf, Assistant Director
for Instructional Television
University Telecommunications Center

Purdue University Television Unit has been involved with the use of television for instructional purposes at the University Regional Campus since the 1960-61 school year. During that time TV Unit personnel took part in discussions with administrators at both the Indianapolis and the Hammond Regional Campuses to consider the reception of televised instruction. At that time it was hoped that installation at those campuses could lead to the reception of instruction from the main campus. The means of distribution was left to the future.

Plans continued during the 1961-62 year for the Purdue University-Indiana University exchange of courses via a microwave TV link. Plans were also developed at this time to include the Purdue University-Indianapolis Campus in the circuit with accompanying talkback facilities. The Television Unit at that time had informational discussions with deans and department heads to begin preparation for the use of the facility to reach the Indianapolis campus and Indiana University.

The microwave system linking Purdue and Indiana University and the Purdue Center in Indianapolis was ready for use in September 1962, with an accompanying talkback system allowing the instructor to hear questions from the receiving classroom. The distribution system installed in the Indianapolis Campus allowed the reception of television in five classrooms varying in capacity from 25 to 100 students. Three telvision receivers were installed which were portable among the five rooms. Talkback was provided in three rooms.

In the fall of 1962 the following courses made use of this microwave link:

1. EE 595E "Radio Astronomy" 2:30 M-W-F

   Forty-three hours of graduate instruction presented by the IU Astronomy department and Purdue Electrical Engineering School. Thirteen students (8PU - 5IU) took the course.

2. Math 515 "Numerical Analysis" 10:30 M-W-F

   Fifteen to twenty IU students viewed the lectures while Dr. Sam Conte taught another fifteen to twenty students in Studio B of FWA-8.

3. GS 370 "Music for the Listener" 9:30 M-W

   One hundred and fourteen Purdue students received thirty-five hours of Music instruction from the Indiana University Music Department. The Television Unit recorded the lectures for playback to 10:30 and 1:30 divisions.

4. Engr 100 "Freshman Engineering" 11:00 Tuesday

   Ninety-seven engineering students at Indianapolis viewed these pre-taped lessons.

5. Ento 100 "Introduction to Entomology" 9:30 Wednesday - 1:00 Friday

   Twenty-three students on the Indianapolis Campus received televised instruction for twenty-seven of their lessons.

6. EE 203/205 and 204/206 "Circuits I and Circuits II"

   Fifteen students in Indianapolis received a complete course via TV.

The spring semester of 1962-63 saw a continuation of the GS 370 "Music for the Listener" from Indiana University, and Engr 100 and EE 203/205 and 204/206 from Lafayette to Indianapolis.

During the 1962-63 year the Industrial Engineering, Civil Engineering, Mathematics, Pharmacy, Agriculture Education, Nuclear Engineering and History Departments were involved in distribution of seminars and special lectures to both Indianapolis and Bloomington.

Use of the microwave continued during the 1963-64 year as follows:

EE 201 and 202 "Circuits I and Circuits II" consisting of 54 tape recorded lessons were viewed by some twenty students at the Indianapolis Regional Campus each semester.

Freshman Engineering 100 had more than 100 students viewing on the Indianapolis Regional Campus.

General Studies

A. GS 370 - Music Appreciation to 110 students, televised from Bloomington to Purdue. 32 lessons.

B. GS 356 - Astronomy to over 125 students at Purdue while being taught by Prof. Edmundson at Bloomington. 32 lessons.

C. Mathematics 514 "Numerical Analysis" was again presented to Indiana University graduate students--some 12 in number--while being taught to 15 students here on campus.

D. GS 404 - Agronomy A special course in soils, not taught on the Purdue Campus, distributed to some 15 students in Geology, Architecture and Geography at Indiana University.

E. Entomology 100 was distributed to the Indianapolis Regional Campus.

The Television Unit began work during the 1962-63 year with the University Extension Administration in the distribution of lessons to the Indianapolis Regional Campus. Twenty electrical engineering seminars were televised live to Indianapolis and Bloomington. Eleven of these were video-tape recorded and shown to groups at the Evansville Community College and two were shown at Ft. Wayne.

The Department of Psychology distributed two seminars and one Industrial Engineering seminar was distributed to Indianapolis and Bloomington also.

SECTION 5

STATEWIDE TELEVISED PHARMACY SEMINARS

Dr. Bill D. Jobe
Associate Professor of Clinical Pharmacy

Pharmacists and their continuing education needs are unique among the health professions. It is virtually impossible for very many pharmacists to leave their responsibilities in the community to return to the University Campus for continuing education. The number and potency of new drugs have so markedly increased in recent years that professional education is soon out-dated. Patterns of health care delivery are reshaping the traditional role of most medically allied professionals. In order to meet these challenges, the School of Pharmacy and Pharmacal Sciences turned to television for providing continuing education beginning in 1968.

The elected representatives of the State of Indiana wisely provided for a unique educational resource in establishing the Indiana Higher Education Telecommunication System (IHETS). It consists in part of a closed-circuit television network linking Purdue with 13 other state university campuses and enables both visual and two-way communication among student audiences on each campus.

The IHETS network had enabled Hoosier pharmacists to receive quality continuing education from a variety of experts at a time and place convenient to their circumstances. Beginning in 1968, the School of Pharmacy and Pharmacal Sciences pioneered the use of the network for continuing education. Late evening programs of two-hours duration were immediately popular, particularly since participants had the opportunity to ask questions and make comments via the two-way audio system. Nearly 400 pharmacists participated the first year and programs have grown each year when in 1972, 550 pharmacists participated in eight bi-weekly programs at 13 different state university campuses. This number represents approximately 20% of the actively practicing pharmacists

in Indiana and speaks well for the program since most such formal continuing education programs average around 10% participation.

The School of Pharmacy and Pharmacal Sciences works on a cooperative basis with Butler University College of Pharmacy and the Indiana Pharmaceutical Association (IPhA) to develop both television and campus-based continuing education programs. An IPhA committee composed of a majority of practicing pharmacists assists the schools with the development of program content and evaluation. In recent years emphasis has been placed on the pharmacist's responsibility to the patient and his physician in supervising the patient's safe and effective use of drug products. Programs have involved practicing medical specialists discussing their approach to disease management with drug therapy. Following the television broadcasts, individual seminar-type discussion sessions are held which have opened up pharmacist-physician communication in a unique way. It is the School of Pharmacy's belief that the patient will be the ultimate beneficiary of their positive dialog.

In the near future all pharmacists may be required to provide evidence of participation in continuing education in order to renew their licenses, and if this comes about the School of Pharmacy will be ready to meet its responsibilities.

SECTION 6

LIVE TV SEMINARS ON COMMUNICATIONS DISORDERS

Robert G. Showalter
Associate Professor of Audiology and Speech Sciences

The Department of Audiology and Speech Sciences, Lafayette campus, has been awarded Special Project Grant funds from the U.S. Office of Education to continue development of a professional education program for specialists in five states working with the communicatively handicapped.

This prototype special project utilizing interactive television has as its objective the application of wide-area telecommunication with talkback as a viable means of disseminating relevent information to more people at less cost while at the same time retaining teacher/learner interaction.

The telecommunication system being used is the Indiana Higher Education Telecommunication System (IHETS). IHETS links all of the state universities and their regional campuses with a closed-circuit television network. Six of the 13 regional campuses in Indiana are located near enough to state lines to be readily accessible to specialists in Illinois, Kentucky, Michigan, and Ohio. IHETS has two unique features which lend themselves well to continuing professional education. First, a closed-circuit system permits the originator to select the viewing audience and secondly, a "talkback" system enables the viewers to interact with the lecturer as well as participants at the other reception centers.

DESCRIPTION OF THE PROTOTYPE

Before describing the program format proposed for 1972-73, it would seem appropriate to review the results of the first year's (1971-72) project. Although Special Project continuation requests are due at a time the preceding year's project is two-thirds completed, there seems to be ample data upon which preliminary judgements can be made.

Special Project support funds were provided for a series of six IHETS telecasts each two hours in length. The telecasts originated from the Purdue University television studios and were transmitted to the following reception centers:

Bloomington, Indiana University
Evansville, Indiana State University
Fort Wayne, Indiana-Purdue
Gary, Indiana University
Hammond, Purdue Calumet
Indianapolis, Purdue University
Jeffersonville, Indiana University
Kokomo, Indiana University
Lafayette, Purdue University
Muncie, Ball State University
South Bend, Notre Dame University
Terre Haute, Indiana State University
Vincennes, Vincennes University
Michigan City, Purdue North Central

At each reception center an area coordinator was selected on the basis of his/her professional stature and leadership ability. The coordinator was responsible for coordinating organizational activities in the area, disseminating news releases prepared by the Purdue University News Service, instructing the participants in the operation of the talkback system during the telecast and serving as a discussion leader. In addition, the area coordinators served as an advisory committee for the Special Project, assisting in program planning and evaluation.

SECTION 7

TEACHING FORESTRY VIA TV

William L. Fix
Area Extension Forester

This course is a broad treatment of the forest sciences emphasizing their application in the management and use of forests and associated natural resources. Ecological relationships of plants and animals, including Man, and environmental quality are stressed in lectures by specialists in forest ecology, hydrology, soils, economics, silviculture, wildlife management, outdoor recreation and wood utilization. It is a required introductory course for students majoring in forestry and conservation and may be taken as an elective by other students interested in natural resources.

Forestry 103 has been adapted for distribution to regional campuses by television tapes. A series of twenty-three lectures from 30 to 50 minutes in length are presented by fourteen members of the Department of Forestry and Conservation teaching staff. The tapes are remade as needed to update information and improve technical quality. A text is used in the course and assignments are correlated with the lectures. Additional required reading materials are distributed to the regional campus libraries. Students are also made aware of related publications in their own campus library.

Distribution of Forestry 103 to regional campuses is supervised by a staff member of the Department of Forestry and Conservation working in cooperation with the TV Unit and regional campuses. Forestry 103 classes are scheduled weekly for two consecutive fifty minute periods. The TV tapes are broadcast through closed circuit TV from Purdue to the regional campus classroom. Through live talkback the staff member presenting the lecture, or the course supervisor, handles questions and discussion following the lecture. The course supervisor meets with the class during the first meeting of each semester, exam periods and the final class meeting. A proctor assigned by the regional campus

attends each class meeting to distribute handouts and check attendance. The proctor is usually either a staff member or a graduate student in a related department.

During the fall semesters 1970-71 and 1971-72, the TV tapes were mailed to Vincennes University for use in a related course - Introduction to Natural Resources. Two visits were made to Vincennes by the course supervisor to confer with the instructor and conduct class discussions.

Close contact is maintained with regional campuses via SUVON. In this way unexpected problems and details may be handled quickly and efficiently.

SECTION 8

EXTENSION CLASSES

Dr. Frank K. Burrin
Associate Dean of Continuing Education

In addition to the credit and non-credit courses offered at the five campus locations of Purdue University, a number of credit courses, both graduate and undergraduate, are offered at other locations in Indiana.

In 1971-72 a total of 81 courses enrolling more than 1,179 part-time students were offered at 23 locations throughout the state. A complete listing of those courses is as follows:

COURSE NO.	TITLE	SEMESTER	ENROLLMENT	LOCATION
ED 590Q	Sci. Curr. Imp. Study	Summer	20	Klondike Sch.-Lafayette
ENGL 104	English Comp I	Summer	29	Seymour
COM 114	Fund. of Speech	Summer	Cancelled	Seymour
SOC 100	Intro. Sociology	Summer	18	Seymour
PSY 120	Elem. Psychology	Summer	22	Seymour
ECON 210	Principles of Econ.	Summer	20	Seymour
ENGL 104	English Comp I	Summer	18	Versailles
ENGL 104	English Comp I	Summer	25	Versailles
COM 114	Fund. of Speech	Summer	21	Versailles
SOC 100	Intro to Sociology	Summer	16	Versailles
ECON 210	Principles of Econ	Summer	19	Versailles
PSY 120	Elem. Psychology	Summer	33	Versailles
HIST 252	U.S. in World Affairs	Summer	11	Versailles
PHIL 110	Intro to Philosophy	Summer	Cancelled	Versailles
BIO 109	Zoology	Summer	9	Hanover College

COURSE NO.	TITLE	SEMESTER	ENROLLMENT	LOCATION
ENGL 104	English Comp I	Summer	13	Brookville
ENGL 104	English Comp I	Summer	20	Tell City
ENGL 104	English Comp I	Summer	11	Rockport
CET 100	Math Computations	Summer	14	Jeffersonville
CET 208	Route Surveying	Summer	14	Jeffersonville
CET 104	Elem. Surveying	Summer	14	Jeffersonville
EG 110	Drafting Fundamentals	Summer	14	Jeffersonville
AGEN 510	Advance Ag Mechanics	Summer	23	Paoli
MATH 221	Calculus I for Tech	Summer	17	Crane NAD
POL 101	Intro to Government	Summer	9	North Vernon
A&D 669	Ceramics Workshop	Summer	21	New Albany
MA 490A	Math for Elem. Teachers	Summer	16	Calumet-Gary
IE 536	Operations Research	Fall	23	IU-Kokomo
ENGL 101	English Comp I	Fall	29	St. Elizabeth Hosp., Lafayette
CHEM 107	General Chemistry	Fall	33	St. Elizabeth Hosp., Lafayette
MATH 153	Algebra & Trig I	Fall	12	Versailles
ENGL 104	English Comp I	Fall	19	Versailles
MATH 598	Math for Elem. Teachers I	Fall	14	Versailles
MATH 598	Math for Elem. Teachers I	Fall	17	New Albany
MATH CS590M	NSF Math-CS for Teachers	Fall	36	New Albany
EDUC 591	Sci. for Elem. Teachers I	Fall	Cancelled	New Albany
HIST 576	History of Indiana	Fall	19	New Albany

COURSE NO.	TITLE	SEMESTER	ENROLLMENT	LOCATION
MATH 598	Math for Elem. Teachers I	Fall	27	Corydon
EDUC 591	Sci. for Elem. Teachers I	Fall	10	Corydon
MATH 598	Math for Elem. Teachers I	Fall	Cancelled	Oakland City College
EDUC 591	Sci. for Elem. Teachers I	Fall	20	Jasper
EDUC 591	Sci. for Elem. Teachers I	Fall	16	Seymour
EDUC 688	Soc. Studies Seminar	Fall	Cancelled	Seymour
EET 151	Electric Circuits II	Fall	13	Crane NAD
EET 153	Electronics II	Fall	15	Crane NAD
MATH 222	Calculus for Tech II	Fall	15	Crane NAD
IET 272	Job Evaluation	Fall	8	Jeffersonville
IET 262	Motion & Time Study	Fall	Cancelled	Jeffersonville
IET 104	Indust. Organ-ization	Fall	Cancelled	Jeffersonville
IET 120	Systems & Procedures	Fall	6	Jeffersonville
ENGL 220	Tech. Report Writing	Fall	14	Ft. Wayne-Marion
ME 606	Radiation Heat Transfer	Fall	7	IUPUI-Allison
IED 668	Seminar in Vo-cational Trade and Indus. Educ.	Fall	12	No. Central
EDUC 642	Ag. Ed. Pro-grams for Teachers of Post-High School Students	Fall	10	No. Central
ENGL 104	English Comp I	Spring	10	Versailles
EDUC 688	Soc. Studies Seminar	Spring	8	Versailles
MATH 598	Math for Elem. Teachers II	Spring	16	Versailles
MATH 154	Algebra & Trig II	Spring	Cancelled	Versailles

COURSE NO.	TITLE	SEMESTER	ENROLLMENT	LOCATION
COM 114	Fund. of Speech	Spring	10	Versailles
CS 514	NSF Math - Numerical Anal	Spring	22	New Albany
MATH 598	Math for Elem. Teachers II	Spring	23	New Albany
MATH 147	Algebra & Trig for Tech I	Spring	Cancelled	Seymour
CET 209	Land Surveying & Subdivision	Spring	12	Seymour
EDUC 591	Sci. for Elem. Teachers II	Spring	20	Seymour
EDUC 591	Sci. for Elem. Teachers III	Spring	13	Jasper
EDUC 591	Sci. for Elem. Teachers II	Spring	13	Jasper
MATH 598	Math for Elem. Teachers II	Spring	14	Corydon
EDUC 591	Sci. for Elem. Teachers II	Spring	11	Corydon
IET 104	Indust. Organization	Spring	Cancelled	Jeffersonville
IET 262	Motion & Time Study	Spring	Cancelled	Jeffersonville
IS 252	Human Relations in Ind.	Spring	8	Jeffersonville
EET 151	Electric Circuits II	Spring	10	Crane NAD
EG 110	Drafting Fundamentals	Spring	9	Crane NAD
ME 655	Dynamics of Real Gases	Spring	3	IUPUI-Allison
EDUC 644	Seminar in Vocational Ag. Education	Spring	9	IUPUI-Allison
EDUC 589S	AAAS Science	Spring	30	N. Mont. High School
EDUC 591R	Indiv. Inst. Ele. Schls.	Spring	23	Mintonye Ele. School
IE 579	Adv. Production Control	Spring	15	IU-Kokomo

COURSE NO.	TITLE	SEMESTER	ENROLLMENT	LOCATION
SOC 100	Introductory Sociology	Spring	26	St. Elizabeth Hosp., Lafayette
CHEM 118	General Chemistry	Spring	25	St. Elizabeth Hosp., Lafayette
BIO 221	Intro to Microbiology	Spring	27	St. Elizabeth Hosp., Lafayette

SECTION 9

EVENING CLASSES

Dr. Donald E. Rons, Associate Director
Special Classes, Division of Conferences
and Continuation Services

Evening classes were rarely offered on the Lafayette campus until the Education Department began in 1946 to schedule a number of graduate courses as a result of state legislation which was passed in regard to the continuing education of teachers. By 1959, it was felt that there was a need for an expanded evening class program to serve the educational aspirations of persons other than teachers who were living in a 12-county area around Tippecanoe county.

A Division of Summer Sessions and Evening Classes was established in 1960 in the University Extension Administration and assigned responsibility for administering special summer courses and special evening classes. In 1966, this Division became the Special Classes section of the Division of Conferences and Continuation Services.

The Special Classes section is involved with both regular and special evening classes. The regular evening classes are those which are scheduled and staffed by an academic department either to accommodate full-time students or to cater to a community need. These classes are under the direct supervision of the deans and department heads.

The special evening classes which augment the regular evening classes, are those credit and non-credit classes which are scheduled, promoted, administered, and financed by the Special Classes section of the Division of Conferences to meet the diverse educational needs of persons residing in the greater Lafayette area. Students registering for special evening classes for credit are counseled by either the Admissions Office staff or the counseling staffs in each school and complete their registration with them. Their fees are paid to the Bursar. These fees (less $2 per credit hour) are rebated to the Division of Conferences and are used to

pay for instruction and other costs incurred. Fees for non-credit courses are collected by the Continuing Education Business Office and used to pay for the cost of offering the classes.

A student who is registering as a temporary student, i.e., taking 7 hours or less, may enroll in special evening classes by paying $25 per credit hour if he is an Indiana resident. Some full-time undergraduate students are admitted to special evening classes if for some valid reason they are unable to attend a daytime section of the same class. The credit courses offered in the evening are generally "core" courses leading to a degree in either the School of Humanities, Social Science, and Education or the School of Technology and enable persons employed full-time during the day to get started on working towards a college degree. Other credit courses may be offered if there is a specific need for a group of individuals in the community.

Non-credit classes are offered either to fulfill a vocational need, to convey subject matter to a group who for various reasons may not be admissible to the university to pursue credit courses, or they may be courses designed to fill some educational needs in the community. An effort is made to avoid duplicating courses which may be offered by other organizations or agencies in the community.

Both credit and non-credit classes are offered on the Lafayette campus and off-campus in other locations in a 12-county area for the convenience of students interested in registering for such classes. Typical of off-campus courses are those offered for the St. Elizabeth Hospital School of Nursing in Lafayette and the degree program for Delco Electronics employees in Kokomo.

The approval of the department head is secured for offering credit courses and the Division of Conferences relies on them to recommend qualified instructors for special credit classes.

More than 414 credit and non-credit special classes have been offered by the Special Classes section over the past seven years, and the number of students enrolled has exceeded 7,500. The

number of special classes offered and total enrollment has been increasing at a steady pace each year.

The number of classes and enrollment figures are as follows:

ALL CREDIT AND NON-CREDIT EVENING CLASSES
AND INTENSIVE SUMMER COURSES

	ACADEMIC YEAR		SUMMER		TOTAL	
YEAR (1)	No. (2)	Enrol. (3)	No. (4)	Enrol. (5)	No. (6)	Enrol. (7)
68-69	242	6,457	16	218	258	6,715
69-70	300	7,601	11	168	311	7,769
70-71	282	7,088	16	247	298	7,335
71-72	268	6,767	23	338	291	7,105

SECTION 10

CONFERENCE OPERATIONS

H. J. Griffith
Associate Director for Conferences,
Division of Conferences
and Continuation Services

There were 446 events administered by the Conference Operations section of the Division of Conferences and Continuation Services in 1970-71. This was an increase of 9 events over last year, a 2.1% increase. Total attendance decreased from 74,134 to 68,368, a 7.8% decrease. Table I shows the distribution of these programs by school.

Virtually every academic department or administrative unit on the Lafayette campus either sponsored or participated in one or more of the conference or short course activities operated through the Conference Operations section during 1970-71.

TABLE I

Conference Activities - 1970-71

School or Unit	Programs Scheduled	Programs Conducted	Program Classification (A)	(B)	(C)	(D)	Attendance
Technology	23	23	12	6	5	-	3,196
Agriculture	201	189	133	39	17	-	24,163
Engineering	64	51	12	15	24	-	5,448
Home Economics	39	38	33	5	-	-	4,040
Humanities, Social Science & Education	57	47	17	30	-	-	5,769
Industrial Management	8	7	-	2	5	-	1,362
Pharmacy & Pharmacal Sciences	5	5	1	3	1	-	843
Science	8	8	2	3	3	-	1,011
Veterinary Science & Medicine	18	11	6	3	2	-	587
Other	73	67	23	33	10	1	21,949
Totals	496	446	239	139	67	1	68,368

SECTION 11

INTENSIVE SUMMER COURSES AND WORKSHOPS

Donald E. Rons, Associate Director
Special Classes, Division of Conferences
and Continuation Services

The first summer class was probably held at Purdue in 1878 and the first summer session of consequence was scheduled in 1912. Purdue named its first summer sessions director in the 1920's who continued through 1959 to administer special summer credit programs.

The Special Classes section has administrative responsibility for special summer courses, i.e., any course that doesn't fit the regular eight-weeks program configuration: a two-week, a three-week workshop, a six-weeks course, or a ten-week intensive course or summer workshop. These are scheduled, promoted, administered, and financed completely by the Special Classes section. All of the regular eight-week summer courses are scheduled, promoted, and financed by the respective academic departments and schools on the campus.

Intensive courses and workshops are seen as an important adjunct to regularly scheduled classes either because of unique course content; or the need to develop new course material; or subject matter lends itself to intensive treatment for either teaching or discussion purposes; or the school or department is unable to finance the offering of a special course or workshop for which an audience existed.

During the past seven years, 127 intensive courses or workshops have been offered with a total enrollment of 1,770 students with 38 courses already scheduled for the summer of 1972. The schools most active in offering intensive summer courses or workshops are Agriculture, Home Economics; Humanities, Social Science, and Education; Industrial Administration, Industrial Engineering, and Technology.

The number of intensive courses and workshops together with their enrollment figures are as follows:

YEAR (1)	NO. (2)	ENROLLMENT (3)
1968	16	218
1969	11	168
1970	16	247
1971	23	338
1972	38	---

SECTION 12

PHYSICS MINICOURSE

Dr. O. E. Johnson
Professor of Physics

The course to be described below is one of the results of a continuing study within the Physics Department of Purdue University to develop means by which expositions of some of the fundamental aspects of physics may be effectively and attractively made accessible to the growing "non-mathematical" segment of the student body. While the approach is clearly a break with tradition, it is felt that it will satisfactorily accommodate this new "audience" without compromising any of the traditional educational goals.

The Physics Department of Purdue University will offer for the first time Physics 470 Y and Z, Explorations in Physics, a novel variable-credit course which utilizes a unique modular format for the presentation of a variety of topics of unusually wide-ranging interest. It is believed that the level of presentation, topic content, and course format will combine to make this course an exciting and rewarding educational experience for all undergraduate students, especially students whose majors are outside the areas of engineering and the physical sciences.

A course in this offering is made up of an even number of units called "minicourses" which are selected by each student at the time of enrollment. Each minicourse is monographic in that it deals with one major topic. There are currently eleven minicourses available for selection. The style and level of presentation of each minicourse has been adjusted so that students with the minimum college entrance requirements in mathematics and science may, with reasonable diligence, comfortably and satisfactorily accomplish the course objectives. While certain of the minicourses are clearly related, they should not be construed as being in any sense prerequisites.

Each minicourse will be personally conducted by a physics

professor whose interest in and experience with the major topic is more than simply academic. Emphasis will be placed on self-study, in that the professor in charge will provide a study syllabus and bibliographic lists for comprehensive outside reading assignments. The in-class time will, for the most part, be devoted to demonstrations, experiments, audio-visual presentations, and seminal discussions.

Each minicourse yields one-half hour of course credit and requires eight hours of class time. The initial meeting of each minicourse is a 50-minute introductory session, the next three successive weekly class meetings are each 110 minutes in length. During the last (fifth) week a 50-minute session is held at which a short impromptu essay will be written.

For this course, the semester is divided into three five-week intervals called segments. Each minicourse is offered twice during the semester, once in the morning (Physics 470Y) and again, in a different segment, in the afternoon (Physics 470Z). Each minicourse requires eight hours of class time during one of the three segments, and each pair of minicourses yields one hour of credit. A student may take as many as two minicourses during each five-week segment depending on the details of scheduling and the time available. It should again be emphasized that only courses made up of <u>even numbers</u> of minicourses are allowed. In principle, it is possible to enroll in Physics 470Y or 470Z for 1,2,or 3 credit hours by signing up for 2,4, or 6 minicourses, respectively. Of course, <u>Explorations in Physics</u> may be taken for credit more than once, subject only to the restriction that a particular minicourse may be taken for credit only once.

It is believed that the present collection of offerings combined with the flexibility afforded by the modular format makes it possible for the student to "tailor" a highly personalized and relevant course. He may choose those minicourses which suit his special interests or particular needs. It is expected that the collection of minicourses will be expanded in the future, and students are invited to suggest topics for consideration for minicourse development.

SECTION 13

AUDIO-TUTORIAL AND CLOSED CIRCUIT TV INSTRUCTION IN VETERINARY SCIENCE AND MEDICINE

Dr. Jack J. Stockton
Dean, School of Veterinary Science and Medicine

Audio-tutorial (A-T) programs are constantly increasing in number. At present approximately 20 to 25 courses use A-T to varying degrees. A few courses are utilizing A-T as the exclusive vehicle for transmission of subject content. Several courses utilize A-T frequently as supplements to the classroom presentations and experiences. Use of A-T techniques is present in all of the five departments in VSM.

The A-T programs available make use of combinations of 2 x 2 slides, cassette audio-tapes, 8mm. film loopes, study guides, live and prepared specimens of both plants and animals, and materials for demonstration of various medical techniques and skills. These A-T programs range in sophistication from slide sets with an accompanying study guide to those including four or five of the previously mentioned components with 2 x 2 slides being common to virtually all programs.

The programs are all available to students in the A-T lab equipped with 20 A-T carrels. The programs are coded so that obtaining the needed program and replacing it in its proper place can be easily accomplished by students without a clerk or librarian.

The A-T lab is constantly in use from mid-afternoon through late evening and is open on a twenty-four hour basis. The A-T programs in the A-T lab are often used by small groups (3-5) of students and provide the stimulus for group interaction of students with emphasis on subject matter.

Closed circuit television has been used in the Veterinary School since the enrollment of the first class in 1959. The original equipment (2 cameras with switching and control system) was primarily used as an image enlargement system for presenting

detailed observation of "live" surgical and laboratory demonstrations. A distribution system provided interconnections for origination and reception throughout the school. Repeated live demonstrations proved to be very inefficient in terms of manpower. Live demonstrations also were constantly threatened with the element of unpredictability within the demonstration itself. With the addition of a video tape recorder (VTR) in 1968, this problem was eliminated. The use of television has increased three fold with the addition of the VTR.

Television is used by all five teaching departments. Presently the video tape collection consists of 32 black and white tapes covering 55 different procedures and demonstrations. To date, video tape playbacks have been generally restricted to class or group presentation. Playbacks for individual review or make up have been restricted to special cases. This restriction has been necessary because of equipment limitations. Recent acquisition of a second 1 inch recorder and two 1/2 inch recorders will permit individuals to replay tapes on request.

The Veterinary School is linked to the IHETS network via a single coaxial cable to FWA-8. WAT-21 medical education programs are received daily on channel 4 and are available for viewing on color monitors in the Audio-Tutorial laboratory. Video taping is possible for the purpose of delayed scheduling.

In addition to the standard programmed uses as described above, the CCTV has been used as:

a) mirror image or instant replay for student and faculty
b) wide distribution of programs or speakers throughout the school
c) practical examinations for simultaneous presentation of materials to large numbers of students
d) open house and public demonstrations of procedure from restricted areas such as surgery
e) video tape exchange with other institutions
f) recording field cases and animal behavior studies
g) reconstruction of sectioned specimens in planes different from original plane of sectioning

Requests are pending for the purchase of a color television camera and additional color recording and monitoring equipment. Development of this capability will increase the potential use of the equipment in the areas where color is essential for diagnostic and definitive evaluation viz. pathology, microbiology, anatomy and histology.

SECTION 14

THE AUDIO-TUTORIAL SYSTEM IN BIOLOGY

Dr. S. N. Postlethwait
Professor of Biology

The Audio-Tutorial System was begun in 1961 as an attempt to assist students with limited backgrounds in biology. Special lessons were prepared using audio tape as the primary communication device, and these were made available in the Audio-Visual Center as a supplement to the conventional instruction program. Student reaction was so favorable to this effort that the instructional procedure was totally reorganized around the taped tutorial programs. A great many improvements and modifications have been made during the past years, and the system is still undergoing evolution. The system has been adopted by a great many schools in the United States and in several foreign countries as well. The technique has been applied to a wide range of disciplines and several commercial companies are now using the system in the training of their employees.

The basic idea is very simple: a "good teacher" assembles the materials he would use for the instruction of one student and, while sitting among these materials, talks into a tape recorder as if he were talking with a friend tutoring that friend through a sequence of learning activities. The product, the tape and these materials, are duplicated as many times as is necessary to accommodate any number of students. The student, sitting among the materials, listens to the tape and thus experiences simulated "teacher on one end of the log and student on the other" learning situation. Self-instructional programs produced in this way provide a great potential for flexibility in a learning system. No experiences included in the conventional system need be omitted, and the limit of excellence of the program is totally dependent on the capacity of the instructor who prepares the materials.

In 1969 when Dr. Hurst joined the staff to place the zoology course on Audio-Tutorial, a further modification to provide still greater individualization was explored. The content of a botany course and the zoology course was divided into units called minicourses, and for each minicourse a self-instructional program was produced. Students were requested to master each minicourse objective and with this procedure it was no longer necessary that any student should fail. Students who could not complete all required minicourses by the end of the semester were given an incomplete grade. All students were expected to master the goals or objectives for a given minicourse, and all students would receive a grade of "C" or higher. Several of the early problems with this highly flexible scheme have been identified and solutions determined.

Currently, through the Minicourse Development Project, funded by NSF, minicourses are being prepared by instructors in their area of specialty and an attempt is being made to accumulate a pool of minicourses covering a core of biology.

On completion of this project, it should be possible to tailor biology courses to the individual needs and interests of students. A learning center equipped with these materials could provide both staff and students an opportunity to do remedial study without the embarrassment or inefficiency of attending conventional courses.

Further, since these self-instructional materials can be recombined in a variety of ways, it is reasonable to expect that "Purdue Biology" can now be made available to many of the disadvantaged colleges where it is impossible for limited staff to equal the expertise of the Purdue Biology Department. It is feasible also to exchange instructional materials on an international basis, and the possibility of establishing pilot programs with England, France, Canada and Australia are presently being explored.

Because of the simple and inexpensive technology involved, it is clearly practical to provide equal opportunity education and continuing education of high quality on a more extensive basis than conventional methods.

SECTION 15

USE OF MULTIMEDIA, TRACKED APPROACH TO TEACHING INTRODUCTORY MICROBIOLOGY

Ronald Wright and John Borger
Department of Biological Science

Biology 220-221, Introduction to Microbiology, is designed to be an introductory experience in the area of microorganisms (bacteria, fungi, viruses, etc.) in terms of what they are, how they affect our lives, and what relationships they have to a wide variety of career areas. Since microbiology is so integrally tied to so many areas of study, (medicine, agriculture, pharmacy, home economics, food science, environmental studies, etc.), the clientele of the course is extremely heterogenous in interest, college experience, and degree of scientific sophistication. There are about 350-450 students enrolled each semester. The immediate problems which arise are how to bridge these rather extreme gaps in prior experience and interest and produce students with a working, functional knowledge of microbiology. To achieve these ends, there has been designed a flexible, tracked approach which exposes the student to the basic concepts of microbiology and then shows him how these basic principles are applied in solving microbiological problems in his particular field.

The first nine weeks of the semester are given to the development of the basic principles. During this time, termed the Basics Section, the student attends three regularly scheduled, fifty-minute lectures and a two-hour laboratory each week. Wide use is made of audio and videotaped materials both in the lectures and in the laboratory.

For students lacking a background in a certain area of discussion, remedial audio and video tapes are made available. Each working area in the laboratory is provided with a bench-mounted audio cassette tape player, headphones, and audio-selection panel which allows the student to listen to the audio tape

or any of the three video channels coming over wall-mounted television monitors in the room. By careful selection of the best medium (print, audiotape, or videotape) the materials to be covered is presented in the most meaningful form. For instance, the video channels are often used to demonstrate new techniques or experimental results which are too expensive, too time-consuming, or too hazardous for the individual student to carry out; at other times the student is led through the observation of his experimental results or a demonstration by using the audio tape. At the end of this section of the course the student has been evaluated as to his understanding of these basic principles by classroom examination and laboratory evaluation.

The next six weeks are termed the Applications Section. During this period there is only one scheduled class meeting each week in which subjects of general interest are discussed (cancer, emerging diseases, microbial food production, etc.). The rest of the learning experience is presented on a self-paced basis with the student working with autotutorial materials (audio tape, video tape, video cassette, and printed materials) in the laboratory which is open and staffed 50 hours during the week.

At the beginning of the Application Section the student chooses four required "minicourses" from a list of fifteen which will be offered. Generally these minicourses fit into one of five basic areas or "tracks": agricultural, medical food, environmental, or consumer microbiology. Each minicourse is composed of a set of multimedia instructional materials, study guide, and pre-test. For the average student completion of the materials usually requires about 3 hours.

A student may take as many additional minicourses from any area beyond his required courses as he has time and desire, for which he receives reduced credit. There are also a series of supplementary minicourses covering a wide range of microbiological subjects such as venereal diseases, rumen microbiology, etc. These are available to the student any time

during the Applications Section and are either audio or video cassette tape recordings. There are three video cassette carrels where the student can observe these supplementary minicourses or review the video portions of a previously completed minicourse. At the completion of a minicourse the student is tested over his understanding of the material. Students are also encouraged on an optional basis to design and solve an experimental problem from their field of interest during the Applications Section.

Student response to this approach has been overwhelmingly positive. Generally, they respond most favorably to choice of areas of interest, to demonstration of how the basic principles are applied to specific problems in their field of study, to combination of structured and self-paced learning, to variety of informational media, and to freedom to explore microbiology in a rather open fashion. These self-motivation factors tend to make the students extend themselves into areas of study and depth of application which had not been observed previously in the presentation of this course. To put it more succinctly students are doing more, enjoying it more, and coming out with a better understanding of the field of study.

SECTION 16

INDIVIDUALIZED LEARNING WITH AUDIO CASSETTE, VIDEO TAPE AND CONSULTANT

Dr. W. H. Hayt, Jr., Professor of Electrical Engineering
and Dr. W. L. Weeks, Professor of Electrical Engineering

The smell of a classroom contributes nothing to the typical course of instruction and the feel of the student desks contributes little. Modern technology makes it possible to record the sensory information vital to instruction. We conclude then, save for possible group dynamic effects, the standard classroom is not vital to the instructional process. And, over the past 18 months or so, we have in fact demonstrated that there is at least one alternative to the standard classroom that has several important advantages. Our experience to date covers about 50 "captive" and 325 volunteer students in two different electrical engineering courses.

It is a fact of academic life that classes scheduled regularly at certain hours are often counter-motivational and ineffective for many students (and instructors). More than this, it is also readily observable that, even within those groups we would presume to be rather homogeneous, the learning rates of individuals for particular blocks of material covered in a standard class period is too much for some individuals and too little for others, with the result that some people do not progress as rapidly as they might and some do not develop the competence they might.

The individualized approach that we have developed solves this problem. In developing it, we have attempted to incorporate the main conclusions of current educational and behavioral psychology, to take advantage of modern technology in such a way as to preserve the best features of classroom instruction, and to maintain if not increase the personal contact between student and instructor. Thus to aid the student in his self study we provide detailed statements of the objectives, methods for the

student to check his work immediately, audio tapes, video tapes, and a special room for study with an instructor available for consultation and testing.

We believe that it is desirable to base a course of instruction on a standard textbook, and that the student should become accustomed to learning from such printed materials since he will use them for self education throughout his life. Thus we base the course on a textbook (or a carefully organized set of printed reference materials). The beginning student is provided with a detailed (checkoff) direction sheet which tells item by item what materials he should use, in what order, to accomplish the objectives. This sheet directs the student to blocks of reading and study in the text, to the audio tapes, video tapes, exercise sets, problems sets, objective sheets, check tests and examinations. Typically, the directons follow a pattern as illustrated by the following example:

Directions

( ) Read Chapter 2 to page 43
( ) Listen to Audio Tape No. 2
( ) Work Exercise Set 2 and check for correctness
( ) Read and study pages 43-55
( ) Listen to Audio Tape No. 3
( ) Work Exercise Set 3 and check for correctness
( ) Work Problem Set II and check for correctness
( ) Look at Video Tape B (17 minutes)
( ) Review Objectives for Chapter 2 and prepare for Check Test No. 2
( ) Take Check Test No. 2 and check for correctness
( ) Review Chapters 1 and 2 and the Objectives, and take Exam I
( ) If necessary, review and then retake Exam I until no fundamental errors are made

The audio tapes referred to are boiled down, specially prepared, replicas of what the instructor might say in a typical class. They might elaborate a troublesome point in the text, present an example, supplement the material in the text, or simply present a discussion which, hopefully, the student will find interesting. The audio tapes have supplement sheets with diagrams and equations referred to in the audio tape. These

sheets also have spaces for the student to make notes or work little problems as required by the audio message, in order to increase his active participation (like recitation). The big advantage of the audio-cassette is that they are easily stopped, backed up, and replayed at any point and as many times as desired. The audio-teacher provides as many repetitions as the student desires, and never loses patience.

The video tapes are used in place of the audio tapes in those situations for which visual inputs are especially helpful to the learning process, as with lecture-demonstrations. They too can be stopped and rerun as desired by the individual student.

The Exercise Sets are specially prepared to allow the student to check his understanding of a block of material in a direct fashion. They also lead him in the application of the concepts from simple situations to more complicated ones. The Problem Sets provide the students with a little more challenge since they are designed to require some additional logical thought and/or organization of the material presented earlier. Solutions to both exercises and problems are available to the student in the study room.

For each subunit of the course, for example a chapter of the text, a set of behavioral objectives are developed which tell the student what he should be able to do if he has mastered the material. The objectives are illustrated by the check tests which provide item by item sample questions on each of the objectives. The check tests are practice runs for the examinations and check test solutions are available from the instructor.

Thus, with the materials available, the student progresses as rapidly as he is able until he feels he has mastered a block of material - say two to four chapters of the text. At this point, he informs the instructor he is ready for examination. The instructor then gives him a random sample of examination questions selected from a large number available. The student works out the examination and, usually, the instructor grades it immediately with the student at his elbow, so that he can

reinforce correct ideas and correct wrong ideas. The student must complete the examination without fundamental errors, by repeated trials if necessary, before he can proceed further in the course. A final examination covers the whole course. It is available whenever the student is ready for it, but he has only one try.

The facilities requirements obviously depend on the number of students in the course but are not directly proportional to the number as in a standard class. It is desirable to set aside a pleasant room and have it open a large number of hours per week - we find that 60 hours is satisfactory. To have an instructor available during all of this time implies several instructors which in turn implies a sufficient student enrollment (all the students need not be in the same course however). For student numbers in the range from about 75 to 400, we have found that the following facilities are adequate:

a) seating space - 20 to 25% of enrollment
b) audio playback machines - 5 to 8% of enrollment
c) video playback machines - 1 to 2% of enrollment
d) file cabinets - 2 per course

The most expensive item in the special study room is the instructor. But his time is utilized effectively in that all the routine instruction is handled by the materials described earlier and he spends his time only in one to one instruction on specific items as needed by particular students.

We have two distinct quality control problems: 1) quality control of the course materials and 2) quality control of the student output. Consider first the quality control of the materials. With the type of instruction being described here, the instructor receives almost immediate feedback on the instructional materials. When he is asked the same questions repeatedly, or he sees that the students miss certain problems repeatedly, it becomes clear that certain of the materials need revision or replacement. Thus, with the passage of time (even within a given semester), the materials evolve (through the work of the instructor) so that they do a better and better job of helping the student achieve the objectives.

Concerning the quality control of the students, it is clear that the method is better than typical. The student cannot proceed or finish the course until he has demonstrated a high level of competence in the course objectives, since he must complete each examination with no fundamental errors. The variable is the time required. The "curve" and sliding class averages are gone.

The method of individualized learning with audio cassette, video tape and consultant has many advantages and one major weakness in practice. On the plus side, the method forces the student into an "active" learning role for a larger fraction of his involvement time and gives him a good taste of the methods he will employ for self education throughout most of his life. It forces him into a higher level of competence than usual. It provides maximum opportunity for one to one instruction or "coaching" on whatever subject or idea is needed by the individual student. It provides for immediate reinforcement of ideas correctly learned and cancellation of mistaken notions. Moreover, through formal polls and informal observations, we have reached the conclusion that about 90% of the students who have tried the method like the idea and about 30% of them are very enthusiastic about it; fewer than 5% of the students fail to complete the course because of failure to grasp the material after having put out a conscientious effort; most students who complete the course do so in fewer hours than would be expected in the standard classroom method; the brighter, motivated, well informed student can finish a course in a fraction of the usual time; a number of individuals with poor backgrounds and low learning rates, who probably would have failed in regualr classroom sections, have successfully completed the courses.

A weakness of the method is that it allows the student to progress at whatever rate he chooses, including zero, and consequently it allows the student with good intentions but poor motivation and self discipline to fall seriously behind a normal schedule. Unfortunately, we find that about a third of our students fall into the latter category at some time or another.

SECTION 17

AUDIO-TUTORIAL INSTRUCTION IN ANIMAL SCIENCES

Dr. Jack Long
Assistant to the Dean of Agriculture

Audio-tutorial techniques are used in the Animal Sciences Department as an effective teacher "self improvement" tool. It is being used in two major ways. In the first instance, several instructors in the department use ordinary audio tape recorders to record each lecture. The recording is made during a regular lecture and the instructor plays the tape after class to listen to his presentation. By listening to the tape, the instructor has the opportunity to critique his presentation; in addition, he can check on the actual content of the lecture and determine if the material presented was technically correct and also if his manner of presentation was one that would make understanding of the material, by the student, as easy as possible.

The audio tape instruction technique is being used in Animal Sciences in another unique way. An increasing number of students come from urban areas with an accompanying lack of agricultural background. Thirty-five millimeter slides and explanatory audio tape are available describing a breed of animals or a common agricultural practice to help fill the void in agricultural knowledge as result of lack of farm background. Several instructors have prepared slide-tape presentations of difficult parts of their course or of material not discussed in class which students can use to more effectively master the subject. Another effective use of the audio tape of lecture sessions is the placing of the tapes in the library for student check-out. Since each lecture is taped, the student may re-listen to the lecture to make certain he understands the subject discussed or for the student missing a class due to illness or a field trip this is a most effective way to gain the information presented to the class.

In addition to the audio equipment, Animal Sciences has audio-video equipment including camera, recorders and playback units which make it possible for the instructor to record a lecture or part of a lecture and replay it. By use of this "instant replay" the instructor can not only hear his lecture, but he can see himself and study his presentation to determine mannerisms that may add to or detract from his total effort. Under most conditions, the audio-video taping and replay would be done at periodic intervals in contrast to the audio only which is done at every lecture. Another different, but effective use of the audio-video replay is to record unusual or difficult laboratory demonstrations. By use of the replay technique, the demonstration can be made available at any time. The Animal Sciences livestock judging team coach used the audio-video tape replay to improve the poise and overall ability of his team to give oral reasons as is required in many of their contests. The instructor of the introductory Animal Sciences course taped demonstrations of milk let-down and castration.

Both the audio and audio-video techniques using modern electronic equipment have made possible true "self evaluation" and have improved the quality of instruction in Animal Sciences.

SECTION 18

AUDIO-TUTORIAL LEARNER CONTROLLED LABORATORY

Gilbert L. Rainey
Head, Department of
Electrical Technology

Exciting innovations and new developments in teaching methods are appearing throughout the country in a variety of academic fields. The development of high quality low cost audio-visual equipment has encouraged educators to investigate new teaching methods and techniques. The audio-tutorial teaching method developed by Professor Samuel Postlethwait of Purdue University is one innovation that has acquired widespread recognition in biology courses in high schools and universitites. The method has also been adapted to other fields on an experimental basis.

Ar analysis of any educational course or program reveals the need for the following:

1. A method for the storage and transfer of information
2. The opportunity and tools for the student to engage in independent study
3. The opportunity for the student to apply what has been learned
4. Realistic evaluation procedures to determine the progress of the student

Audiovisual instructional equipment and materials provide new dimensions for the storage and transfer of information. Since the audiovisual instructional devices are controlled by the student, the pace is determined by the ability of the student. The method also has potential for remedial programs, continuing education programs and industrial training.

The Learner Controlled Laboratory is a title used to identify the new Electrical and Electroincs Technology laboratory that uses the audio-visual-tutorial teaching method. The laboratory has been in operation since 1968 at Purdue University. In addition to the utilization of audiovisual equipment for the "storage and transfer of information", the laboratory provides the "opportunity for the

student to apply what has been learned".

The success of the Learner Controlled Laboratory is based on the actual operation of the low cost audiovisual instructional equipment by the student, not the instructor. The ever increasing quantity of basic material that the student is required to master forces the instructor to obtain assistance from all sources. If the majority of the students are to attain a satisfactory achievement level in the limited time that is available, information must be supplied in a variety of forms at the moment that the need occurs. It is impossible for the laboratory instructor to provide this assistance for all students in the conventional laboratory, but the Learner Controlled Laboratory provides a wide variety of support audiovisual instructional materials that are operated and controlled by the student.

The general procedure for the use of the audio-visual-tutorial method in the Learner Controlled Laboratory starts with the reading of the concise discussions of the technical information in the laboratory textbooks. Each unit is called a"minicourse" or "module" and contains behavioral objectives, equipment requirements, written explanations, experimental procedures and questions. The student is supplied with an audio tape, color slides and the special devices necessary for the performance of the minicourse. The student uses headphones that plug into a low cost tape player and watches color slides that are co-ordinated with the audio tape to obtain additional information.

Students are able to control the audio tapes and slides, which provides the opportunity to repeat the parts of the briefings that are causing difficulty. Although it is possible to listen to the entire tape and watch all of the slides at the beginning of the minicourse, it is recommended that the student obtain the briefing on a single part, then perform that part of the minicourse. At the completion of a part of the minicourse, the student should listen to the audio tape and observe the slides for the second part, then complete the experimental procedure. Completing the procedure in small units that change the activities and involvement of the student is a recognized good teaching procedure. The opportunity to read the explanations in the laboratory textbook,

listen to the briefings on the audio tapes, observe the color slides that support the audio tapes, and perform the actual experimental procedures provides the student with an increased opportunity to complete the performance objectives of each minicourse. The addition of the support instructional materials assists the student in obtaining a better understanding of the basic principles, decreases the amount of time required for the completion of each minicourse, and develops attitudes that lead to self-study and experimentation.

The student has complete control of the instructional materials and may view the slides and listen to the tapes as many times as necessary to obtain the required information. Almost ALL students require repetition of the explanation of at least a few topics during the study of electricity and electronics. The audio-visual-tutorial method is particularly useful for the serious student with limited technical background, and it is not unusual for these students to listen to the explanations of difficult materials many times. Although it is possible for a team of two students to perform the minicourse, most students prefer to work alone. Students with considerable laboratory experience complete the objectives of many minicourses quickly and are free to complete additional projects or utilize the time in other courses.

Slides and tapes used in the audio-visual-tutorial method do not take the place of the instructor, but free the teacher to teach! Students obtain the technical information and instructions from the audiotapes and slides, which leaves the instructor free to work with the students on real problems rather than assisting with the routine wiring of circuits, step by step explanations, and explanations of instrument operational procedures. If the teacher becomes free to spend more time in the office, grade papers, engage in consulting work or research, hold philosophical discussions with other faculty members, or engage in other activities, the important advantage of the audio-tutorial teaching method is lost.

Students in today's society need personal attention and an exchange of information on a one-to-one basis. The instructor in the Learner Controlled Laboratory plays a different role and has this opportunity to know the students and work with them as individuals. In fact, this is the first priority assignment of the members of the instructional team. The methods used for individual student contacts are planned by the instructional team during the weekly orientation meeting. Placing name cards on the work bench is one method used by the team to make certain that each student is addressed on a first name basis. A record form is used by the instructional team to make certain that the planned student contacts are made in the laboratory. It was found that some students who need help actually avoid contact with the teacher. The teacher does not utilize the lecture method for the transfer of information, but assumes the role of the consultant, diagnostician, prescriber, and motivator.

The students are required to take a follow-up test that is given immediately after the completion of the minicourse. These tests are usually about five to ten questions in length and are based on the behavioral objectives listed in the laboratory textbook at the beginning of each minicourse. The test is usually of the short answer multiple choice type and is graded by the laboratory instructor immediately after the minicourse is completed and the results are given to the student. These tests are supplemented by periodic laboratory performance examinations on the operation of equipment, analysis of circuits, and measurements. At scheduled time intervals, members of the instructional team meet with small groups of students. The meeting is planned by the instructional team during the weekly orientation meeting. The meeting with the students is conducted on an informal basis and includes discussions, oral examinations, briefings on new experiments, oral reports by students, and the grading of the laboratory logbooks. Every attempt is made to determine the progress and to uncover the hidden and sometimes small problems that create mental blocks or "hang-ups".

Students who satisfactorily complete the experiments, make an acceptable grade on the follow-up tests, and make an acceptable contribution during the periodic meeting with members of the instructional team earn an average or C grade. Students who wish to earn a higher grade of A or B take a series of A-B examinations, complete special projects, and earn additional credit by answering difficult questions during the small group meetings.

The audio-tutorial instructional materials used in the Learner Controlled Laboratory may be used in the conventional two or three hour laboratory period. The greatest achievement made possible by the self-teaching instructional materials, however, was the development of the OPEN LABORATORY concept. Students are free to schedule work periods in the open laboratory at any time during the day. The laboratory is open from 8:00 a.m. until 5:00 p.m. Monday through Friday. Students schedule their own work periods that may be adjusted to compensate for peak study situations in other courses and have the opportunity to obtain additional laboratory experience beyond the requirements of the course. Students like this open laboratory concept and soon learn to work in an efficient and organized manner. The control of the instructional materials, the freedom to schedule time in the laboratory, and the removal of time limitations for the performance of each minicourse change the attitudes of the students toward the laboratory course. Some students complete the entire course requirements in a short period of time, but other students experience difficulty when periodic deadlines were not required. To help some students retain a realistic schedule, minicourses are retained in the laboratory for two-week intervals. Students with problems such as illness or academic deficiencies may receive extensions. This change in the operation of the laboratory creates a LEARNING CENTER that provides the opportunity and facilities for independent study and experimentation.

The Learner Controlled Laboratory that uses an open laboratory may be operated with a large number of students or a small number of students. A large number of students may be scheduled

in a single laboratory throughout the week. If the student body is not large, several different laboratory courses can be scheduled in the same laboratory room. Since instructional materials are available for self-instruction, the laboratory instructional team can provide the required assistance for a wide variety of mini-courses simultaneously. This unexpected "fall out" has made it possible to economically conduct a number of different courses with limited enrollment in the same laboratory at the same time.

Slides and audio tapes which are co-ordinated with laboratory textbooks are already prepared for introductory courses in Electrical and Electronics Technology. The materials have been revised a number of times and include numerous suggestions obtained from the students and the members of the instructional team. The amount of time that was necessary to develop the audio-tutorial materials for the entire laboratory course was far greater than we had anticipated. About eighty freshman and sophomore minicourses are now conducted by the audio-visual-tutorial method.

Faculty members who plan to develop materials for the audio-visual-tutorial teaching method in the Learner Controlled Laboratory should start the project with the careful preparation of the behavioral objectives for each experiment or unit. Since this is a laboratory course which stresses performance, the behavioral objectives listed for each experiment should be called PERFORMANCE OBJECTIVES to provide better communication with the students. To provide information at the moment that the need occurs, the written laboratory minicourse should include technical background information as well as procedures. The color slides and co-ordinated audio tapes are related directly to the experimental procedures. Since it is possible and not unusual for students to learn wrong procedures and concepts from "experience", the students are supplied with as much information as possible in the introductory courses. It is usually necessary to prepare a preliminary audio tape, then carefully co-ordinate the final tape with the slides and laboratory textbook.

The cost of the equipment used by the student is very low and consists of the following:

Portable Audio Tape Player	approx. $25
Slide Projector	approx. $65
Projection Viewer	approx. $30
Headphones	approx. $15
	Total $135

The preparation of the slides and tapes will require a large amount of time and is the greatest direct cost. For example, 700 color slides and 28 audio tapes are used with DC Electricity, 795 color slides and 24 tape cassettes are used with AC Electricity, and 775 color slides and 33 cassettes are used with Introductory Electronics. Although some audio-tutorial programs only use audio taped information, we feel that the addition of visual information such as color slides is essential for many students. Slides, filmstrips, movies or video tapes of actual operating circuits and instruments add realism and decrease the time required to understand basic principles.

The open laboratory is very popular with the students, but it does not eliminate operational problems. These problems probably existed in the conventional laboratory, but they cannot be tolerated in the Learner Controlled Laboratory since the students are expected to complete each minicourse regardless of the time required. Students are very critical when faulty equipment or lost components result in delays and loss of their time. The open laboratory does result in better utilization of equipment. A single piece of equipment can be operated by a large number of students without a loss of time if audiovisual as well as written instructions are provided.

A visit to a school that is using the audio-tutorial teaching method is highly recommended to investigate the advantages and determine some of the problems. The method will not solve all existing problems such as faculty overload, shrinking budgets, inflation, and increasing enrollments, but it does have great potential as a teaching method. Vigorous development work from many dedicated teachers will be required to implement this dynamic teaching method.

SECTION 19

COOPERATIVE EDUCATION PROGRAMS

G. W. Bergren, Administrative Dean for Academic Affairs
Regional Campus Administration

The University Industry Cooperative Engineering Education Program of Purdue University is a five year study-work plan of education in which the student alternates periods of attendance at the University with periods of employment in government or industry.

The main purpose of the program is to provide the student with the opportunity to develop into a more mature capable engineering graduate by integrating his University experience with well planned industrial experience related to his field of study.

In 1953 as a result of requests from interested employers and students Dr. A. A. Potter, then dean of engineering requested Professor H. L. Solberg, then head of the School of Mechanical Engineering to explore the possibility of establishing a co-op program. A faculty committee was appointed and chaired by Professor G. W. Bergren which considered the question in depth. As a result, the committee prepared an engineering faculty document recommending the establishment of a program. The document was approved by the faculties of the School of Mechanical Engineering and the Schools of Engineering. Subsequently the Trustees authorized the award of a certificate to students who satisfactorily completed the co-op program.

The M. E. Co-op program was launched in the fall semester of 1954 with the placement of 10 students in co-op assignments with 6 employers. The program was well accepted by employers and students alike. By 1959 most of the Schools of Engineering had established similar programs. Currently there are approximately 750 engineering students enrolled in co-op programs with 350 employers from 33 states.

Although the number of engineering students enrolled in a co-op program is relatively small in terms of the total number of engineering students enrolled in the University, the program is among the largest in the country in terms of enrollments.

The program has had wide acceptance by students and employers alike because 1) strong academic direction has been provided by the departments, 2) employers have been excepted for the program only after their co-op training programs have been approved by the Schools of Engineering Co-op Council, 3) the quality of the students has been excellent because they must complete their first year in the University in the upper half of their class before they are accepted for the program, and 4) the co-op coordinators at the University have worked closely with their counterparts in industry to assure that the students are provided with meaningful work experiences related to the student's field of study.

The policies and procedures under which the co-op program operates are set forth in detail in Executive Memorandum No. A-301 and the Report of the Ad Hoc Policy Committee on Cooperative Education dated November 1, 1970.

The co-op student registered in the University is assessed a special fee of $100 per semester for each semester or summer session that he is enrolled for a co-op industrial practice course. The fee generates a total income of $500 per student during the three years that student is enrolled in co-op practice courses. Under the program, the student normally spends his first and last year as a full-time student. Thus the 750 student enrollments generate approximately $375,000 of income over a three year period or $125,000 per year. The current estimated direct costs for administering the program is approximately $125,000 per year as set forth in Part III of the Ad Hoc Policy Committee Report.

As noted above, the student pays a total fee of $500 for five work periods in industry. However, the total average income earned by the engineering co-op student is estimated to be $15,000 while employed. In addition to its educational values, the program does provide a substantial financial aid program for the student.

In recent years the School of Technology has implemented co-op programs in some of its departments. However, these programs have not been formally recognized by the Board of Trustees in

terms of awarding a certificate. Also, other Schools of the University and the regional campuses are considering the implementation of co-op programs.

The Schools of Engineering program is administered by a director of cooperative engineering education attached to the office of the dean. Each school with a program has designated a faculty member as a coordinator for its program. The appointments have been part-time appointments. The policies and procedures under which the program operates have been coordinated through a Cooperative Engineering Education Council which includes the director and the co-op coordinators.

With the growth of the co-op programs and the proposed expansion of the program into other Schools of the University and the regional campuses, a need to develop a University-wide mechanism to manage the programs became apparent. On February 10, 1970, Vice Presidents Hawkins and Lawshe appointed an Ad Hoc Policy Committee on Cooperative Education to consider the matter and make recommendations accordingly. Subsequently President Hovde issued Executive Memorandum A-301 dated 25 February 1971, which created a University-wide Cooperative Education Coordinating Committee to implement the recommendations of the Ad Hoc Committee.

The cooperative education program of the Schools of Engineering was established after a careful review of the experience of other institutions with similar programs. Based on the acceptance of the program by students, faculty and employers, it has proven to be a sound educational program.

SECTION 20

APPRENTICE TRAINING EARNS COLLEGE CREDIT

Charles Snyder, Acting Chairman and
Associate Professor of Mechanical Engineering Technology
Fort Wayne Campus

Graduates of two local General Electric training programs, the apprentice program and the manufacturing studies program, can now look forward to receiving college credit from the Technology Section of Purdue University - Fort Wayne for their work in those programs, as a result of an agreement between officials of G.E. and the Purdue Technology Section.

Purdue here will grant G.E. apprentice graduates approximately 26 credit hours when they pursue a two-year mechanical engineer technology associate degree. The 26 credit hours complete more than one-third of the requirements for the two-year associate degree.

Persons who have completed the basic manufacturing studies courses at G.E. would receive up to an additional 18 credit hours in their junior and senior years as they work toward their B. S. degree in mechanical technology. Apprentice graduates interested in continuing toward the same B. S. degree would be granted an additional six credits that would apply in the third year of the program.

According to Purdue and G.E. officials, credits will be granted when the following conditions prevail:

A. An apprentice completes related courses in the G.E. apprentice program

B. The apprentice graduates from the apprentice program in Fort Wayne

C. The apprentice-student completes the remaining credits required in the two-year mechanical engineering technology program at Purdue

SECTION 21

DIRECTED STUDY

Leon E. Trachtman, Assistant Dean
School of Humanities, Social Science, and Education

Virtually all departments in the School of Humanities, Social Science, and Education offer students, under a 490 or 590 course number, the opportunity for directed individual work in areas where appropriate courses are not available. In some departments this represents work which is either beyond the normal course of instruction or not of sufficient interest to justify creation of a regularly offered course. Arrangements are made between a qualified instructor and the interested students for regular meetings and the development of a course of study.

Small groups of students also enroll on occasion in courses labeled 590 when they are being offered on a pilot basis. This practice permits the department to try out a novel or experimental course of instruction without becoming committed to it as a regular departmental offering.

Other approaches to individualized instruction are in directed reading or writing courses. These are of an arrange-hour, variable-title, variable-credit nature, and are conducted by conference between student and instructor. In a directed reading course, the amount of credit determines the number of works read, and the choice of subject matter represents the specific interests of the student as they mesh with the special competence of the instructor. Our ability to tailor these programs to student needs and interests enables students to fill in chinks in their educational preparation or to undertake projects which will be of special personal or professional benefit to them.

Individual writing courses are designed largely for students who have achieved some level of literary competence and who wish to undertake a specific writing project in order to develop their sense of literary professionalism. A conference

arrangement with the instructor offers the student the opportunity to improve his ability to complete selected individualized writing tasks in his special field of interest, under faculty guidance.

SECTION 22

INDEPENDENT STUDY

Dr. Donald E. Rons, Associate Director
Special Classes, Division of Conferences
and Continuation Services

Independent study courses have been offered by Purdue University since the mid-50's. The Industrial Packaging Technology and Materials of Packaging correspondence courses were phased out in 1967 because they were in need of revision but there was no parent academic department on campus with staff members possessing the necessary expertise to perform this function. The Pest Control Technology correspondence course is still in existence and has gained such stature in the pest control industry that many individual companies require their new employees to complete this course before being assured of permanent employment. All three of these courses were non-credit offerings.

Purdue's philosophy has been to offer non-credit independent study courses of a vocational nature as opposed to university credit courses or high-school level courses. This is because we feel our staff can best make their contribution in this area and because there are many universities and colleges across the country offering academic-type credit courses and our efforts would merely be a duplication of their offerings.

It is believed that future independent study courses might come from the areas of turf management, institutional management, foods and nutrition, and electrical and mechanical engineering technology. However, courses could be developed in conjunction with other teaching techniques which would be utilized to fufill a specific educational need for a specific occupational group within the economy.

SECTION 23

GUEST-HOST PROGRAMS

G. W. Bergren, Administrative Dean for Academic Affairs
Regional Campus Administration

During January 1962, the Presidents of Indiana and Purdue Universities respectively signed a "Guest-Host Agreement" which establised policies and procedures whereby one institution may offer undergraduate courses, associate degree courses or programs, graduate level courses and non-credit courses or programs from the other institution in facilities of its own away from its main campus. Graduate level programs in contrast to courses were excluded in the agreement.

The agreement pertains only to those activities taking place within a facility owned by one of the two insitituions and is procedural in nature; subsequent written permissions with the approval of the concerned departments and schools must be developed before courses or programs may be offered under the agreement.

The following Purdue programs are now offered at I.U. Campuses under the basic guest-host agreement and subsequent specific agreements.

Program	Location	Date Initiated
1st yr. Engr.	I.U. South Bend	September 1963
1st yr. Engr.	I.U. Jeffersonville	September 1963
1st yr. MET		September 1963
AAS MDDT		September 1968
AAS EET	I.U. Kokomo	September 1967
AAS MET	I.U. Richmond	September 1966
AAS IET		February 1970

The financial responsibility for a guest-host program rests completely with the host campus. Before a program is instituted

under a guest-host arrangement, a formal proposal is prepared. The proposal includes sections on staff and laboratory requirements which must be provided. Thus the chancellor or dean of the local host campus knows the financial commitment which must be made when he recommends approval of the implementation of a program.

In the first semester 1970-71 there were 13 students enrolled at IU South Bend, 114 at IU Jeffersonville, 101 at IU Kokomo and 140 at IU Richmond as shown in ATTACHMENT A.

The number of Purdue AAS degrees conferred through June 1972 at each location since the programs were begun are 12 at IU Jeffersonville, 27 at IU Kokomo and 35 at IU Richmond for a total of 74.

Although the number of graduates to date is small, the enrollments where AAS degree programs are in place are more than 100 at each location. The low number of graduates can be explained by the fact that most enrollees are employed students pursuing degrees on a part-time basis. Thus the University is fulfilling a need of local students who cannot continue their educations at a Purdue campus as well as a need of local industry who pressed for the implementation of the programs.

Currently the AAS programs are being staffed by two resident full-time Purdue University faculty members supplemented by qualified part-time faculty members who teach the Purdue University courses. The cognate courses required in the curriculum are taught in regular classes offered by the local I.U. campuses.

The Purdue staff members function under the administrative direction of the local chancellor or dean and the academic direction of the School of Technology and the Department. Promotions of Purdue faculty members at host institutions are initiated at the local campus and pass through the Purdue University process.

All students are admitted to a guest-host program by the local admissions officer under Purdue University admission standards.

The local Purdue staff members assist the local admissions officers in monitoring the admissions.

The local registration officer maintains all records for the local students. When a student becomes a candidate for a degree, the I.U. registrar prepares a transcript together with a list of courses in which the student is enrolled. From this record, a Purdue University candidate audit form is prepared which then is cleared through the School of Technology. This faculty then recommends to the Board of Trustees that a degree be awarded to those candidates who satisfy the requirements for a degree.

Under the guest-host arrangement, courses and/or programs unique to Purdue University have been made or can be made available at all regional campuses in the State.

The local industrial community has strongly supported the offering of Purdue programs and in some instances is pressing for expansion of the offerings of the School of Technology at the local campuses. In particular I.U. East (Richmond) would like to implement a B.S. program in Mechanical Technology in the near future.

Although the I.U. Chancellors and/or deans have expressed concern over the costs for offering the Purdue programs, they have been most cooperative in providing the administrative and financial support necessary to offer the programs.

Finally it is felt that the guest-host concept should be continued and encouraged as necessary to meet the needs of the local community particularly in the fields of engineering technology.

ATTACHMENT A

Enrollments 1st Semester 1970-71

Location	Enrollments
I.U. South Bend	13
I.U. Jeffersonville	114
I.U. Kokomo	101 *
I.U. Richmond	140

* 2nd Semester 1970-71

Total Number of AAS Degrees Conferred Through June 1972

Location	Number	
I.U. Jeffersonville	4 + 8 *	= 12
I.U. Kokomo	20 + 7 *	= 27
I.U. Richmond	21 + 14*	= 35
Total		74

* June 1972 estimate

SECTION 24

THE COLLEGE LEVEL EXAMINATION PROGRAM (CLEP)

Dr. L. O. Nelson, Administrative Dean for Student Services
Regional Campus Administration

The College Level Examination Program is designed for the purpose of evaluating non-traditional college-level education such as independent study, correspondence work and credit earned from non-accredited institutions.

1. General Examination

   No credit will be given on the basis of the General Examination. Transfer students who previously attended a non-accredited institution may take the General Examination. If an average score of 500 or above is received, the credit established at the non-accredited institution may be evaluated for credit at Purdue.

2. Subject Matter Examinations

   Purdue credit may be established by taking certain subject matter examinations. A list of examinations approved by the faculty and the score required to establish Purdue credit appears on the next page.

SUBJECT EXAMINATION	PURDUE EQUIVALENT	SCORE REQUIRED
Biology (Student must take both sections to receive credit.)	Biology 103 & 104	61+
Human Growth & Development	Undistributed	45+
General Chemistry	Chemistry 101	45+
(Home Economics)	Chemistry 107 & 108	45+
(Prepharmacy)	Chemistry 109	45+
(Agriculture)	Chemistry 111 & 112	45+
(Humanities)	Chemistry 113 & 114	45+
(Engineering, Biology, Chemistry, Physics)	Chemistry 115	45+
Computers & Data Processing	CS 210 & CS 380	45+
Money & Banking	Economics 330	45+
Geology	Geoscience 110	45+
American History	History 251 & 252	45+
College Algebra & Trig (Student must take both sections to receive credit.)	Math 151	57+
Introductory Calculus	Math 161 & Math 162	55+
American Government	Pol. Sci. 101	45+
Statistics	Psy. 301 or Psy. 500	42+
Tests & Measurements	Psy. 302 or 505	45+

SECTION 25

ADVANCED CREDIT EXAMINATION PROGRAM

Dr. M. B. Scott
Associate Dean of Engineering

Each summer about 500 freshman engineering students participate in Purdue's Advanced Credit by Examination Program. Last year's group established approximately 1600 hours of credit in mathematics, chemistry, physics, engineering graphics, and communication by taking examinations offered in these subjects. All Purdue Advanced Credit tests are administered each weekday during the "Day On Campus" period and on specific days during the delayed registration period before classes start in the fall. TESTS in each area ARE FREE and there is NO PENALTY FOR TRYING them. Academic areas of the university which offer engineering and other students examination options for advanced credit in specific course levels include:

1. Mathematics
   a. MATH 151
   b. MATH 161
   c. MATH 162
   d. MATH 261
2. Modern Language
3. Physics
   a. PHYS 152
4. Engineering Graphics
   a. ENG. GRAPHICS 116
   b. ENG. GRAPHICS 117
5. Biology
   a. BIOL 103
6. English
   a. ENGL 102
7. Chemistry
   a. CHM 115
   b. CHM 116
8. Communications (Speech)
   a. COM 114
9. History
   a. HIST 251
   b. HIST 252
   c. HIST 203

Information about specific tests or specified dates for taking exams may be obtained from the Department of Freshmen Engineering or the subject matter department listed.

SECTION 26

THE SPAN PLAN PROGRAM FOR WOMEN

Dr. Cecelia Zissis, Director
of Span Plan

The Span Plan, devised by the Office of the Dean of Women, coordinates a three-part program involving 1) the Freshman Conference Program, 2) the Student Wife Grant Program, and 3) the Counseling of Mature Women. The Span Plan Office provides factual information and materials to all Purdue women students and the University community about the changed patterns in women's lives.

The name Span Plan refers to the belief that girls and women should make education and work plans for their total lifespan. According to the Span Plan Chart, a woman at age 35 has her last child in school, and has 30 active years before her. In order to use this time effectively, she needs to plan for the varying time periods in her life, and prepares herself educationally to enter a rewarding and interesting activity or occupation. Adequate preparation includes the ability to support oneself and family, should the need arrive.

The Freshman Conference Program. A major focus of the Span Plan Program is the freshman group conference program which is carried out by all staff counselors. The program is designed to provide opportunities for all new women students to become acquainted with the services and staff of the Dean of Women, and to help these young women develop a keener awareness of the importance of long-range educational planning.

The Span Plan Concept of long-term lifespan work and study planning for girls and women needs to reach young women early in their school life. It is hoped that the information, encouragement, and motivation generated through the freshman program will help foster increased self-awareness for Purdue women students.

The Student Wife Grant Program. The Span Planners believe there should be more two-student families among the married students on campus. The Office of the Dean of Women has long been concerned

that so few of the wives of married undergraduate men students are students themselves. A questionnaire to a sampling of 119 wives brought an 89% response indicating that only 16% of the respondents were enrolled in any Purdue class. Most wives are either employed outside the home, or busy caring for small children in the home. While the husband's formal education is progressing, the wife's is at a standstill. These young couples need very much to know about the changes in women's lives in the last 20 years.

In order to assist this group, wives of Purdue men students, a specific program offering small grants to a limited number of women was established in 1968. Each semester young wives are encouraged to apply for a grant which enables them to enroll for one academic credit course. Priority is given to beginner students who have had no previous college work.

Funds are distributed through the Emergency Gift Fund of the Office of the Dean of Women. Grants totaling $18,000.00 have been made to some 250 student wives.

The Counseling of Mature Women. Another aspect of the Span Plan Program is working with the older undergraduate woman student interested in resuming her education, or the older woman of the community who would like to begin and become a student. The Span Plan Office meets the immediate needs of these women, who do not fit the pattern of the typical undergraduate woman student, giving general counseling and guidance for planning educational goals in relation to future goals. The office arranged referral conferences with other agencies, and academic schedules, plans part-time programs, and maintains contact with other agencies interested in helping the returning woman student. Vocational testing and counseling is also available.

SECTION 27

HOME ECONOMICS EXTENSION

Dr. Eva L. Goble
Dean, School of Home Economics

Home Economics Extension is concerned with continuing education for all individuals. Programs are informal and usually non-credit.

The specialist staff has fifteen positions (13½ FTE) working in Clothing and Textiles, Equipment and Family Housing, Foods and Nutrition, Home Management and Family Economics, Human Development, Institutional Management, and Organization and leadership.

PROGRAMS

Clothing and Textiles

Training For Sales Personnel

Through the cooperative effort of area Extension Home Economists, a state clothing specialist and representatives from four fabric retail outlets, plans were made to offer training for sales personnel in fabric departments of stores in the area of South Bend. The purpose of the program was to promote informative salesmanship, which should minimize consumer problems involved in the construction, use and care of garments.

Three two-hour training sessions were held on a weekly basis. Subject matter content included (1) the selection of fabrics, (2) the selection of compatible garment components and (3) an exploration of some of the problems associated with garment assembly and the use and care of the finished product. As a result of the evaluation meeting of the planning committee, a follow-up refresher session was scheduled five months after the series to review any new developments in textiles and related areas that might have implications for retailers and consumers of fabrics.

The favorable response to the program has stimulated interest in offering such training in other areas of the state.

Equipment and Family Housing

Buying or Building a Home

"Houses for Family Living" is a television series planned to inform prospective homeowners about buying or building a home. There are six black and white television tapes which are presently being shown on Cable Television stations. Supplementary materials accompany the series. These same materials are used in presenting a similar program to community groups.

A packet of materials consisting of bulletins, study sheets and references for each lesson in the series was prepared and assembled for each viewer who sent in a registration form for the series.

The series is now being shown in Marion, Columbus and Terre Haute. The specialist taught the series as a non-credit course at IUPUI and at Warsaw.

Home Furnishings - Use and Design

"Design Every Day" was done as a television series of six tapes dealing with the elements and principles of design as applied to furnishing the home for use and beauty. It is being shown by four cable and one educational television stations. The series has been taught to live audiences in Goshen and Winamac. The Area Home Economist and the specialist worked as a team in presenting these two series.

Foods and Nutrition

Expanded Foods and Nutrition Program

Around 200 women are employed throughout 60 Indiana counties as Program Assistants who teach foods and nutrition to low income families. Before actually starting to work each new assistant goes through a three week initial training program in her work. Spe-

cialists help the supervising home economists with these initial training programs and with in-service training of program assistants. Specialists also conduct two two-day workshops each year for home economists supervising the EFNEP and a one-day workshop for Program Assistants during Summer Conference.

Professional Groups

Foods and Nutrition Specialists give instructions in workshops and leader training sessions for Extension Homemakers, American Dietetic Association, Indiana Milk Processors, School Food Service, Childhood Education Association, Head Start, Food Service Supervisors, Commission on Aging, and Careholders for Mental Hospitals.

General Public

A state-wide committee of Foods and Nutrition Area Agents, State Specialists and Registered Dietitians are planning a series of four lessons on how to follow a diabetic diet prescription. This series will be a team teaching effort using specially developed audio-visuals, teaching techniques and aids developed by the committee.

Home Management and Family Economics

Consumer Alert

The consumer marketing Extension specialist is a regular panel member on the "Consumer Alert" weekly television program on WFBM-TV, Channel 6. The other regular panelist is the executive secretary of the Central Indiana Better Business Bureau. The program format includes responding to viewer letters and comments by panelists.

Southern Indiana Consumers Workshop

Consumer issues and implications are topics discussed by national speakers for this workshop of lay consumers and profes-

sionals. The program is designed to present a balanced view of consumerism with business, government and consumers represented.

The workshop is an inter-university cooperative effort since it is sponsored by: Indiana Cooperative Extension Service, Indiana University Bureau of Public Discussion and the Department of Home Economics at Indiana State University.

Exhibits

Portable exhibits for use over the state are currently available from Audio-Visuals on these subjects:

1. What's Your Purchasing Power
2. A Step Toward The Metric System
3. Retire To What?

These have been used extensively at county fairs, consumer education meetings and for displays in schools, libraries and various financial institutions.

Institutional Management

Food Facilities Planning Symposium

A three day symposium on the Purdue campus for restaurant managers and operators was sponsored by the Department of Institutional Management, School of Home Economics and Cooperative Extension Service. The objectives for the symposium were to help managers of food service facilities determine and translate their operational requirements and building needs into layout design sketches and to be able to communicate more effectively with food facility consultants and architects.

Organization and Leadership

U. N. Citizenship School

Indiana Extension Homemakers Association, with the leadership of Extension Home Economics, continued a study of citizenship by introducing a new phase of study.

During the month of February there were eight Citizenship

schools held. They were geographically located to be available to anyone in the state and at the same time gave opportunity to use the services of knowledgeable university people. While other years the women had studied either local, state or national citizenship, this year the study centered around the United Nations. In the eight schools held the total enrollment was over 600. A packet of material on the U.N. was made available for each participant. The agenda included everything from study of the basic structure of the U.N. organization, a film "The U.N. Plaza", Flags of the U.N. (slide set), detailed study of FAO, to a presentation by a Political Science professor on the purpose and scope of the U.N.

Attending one of these schools is a pre-requisite to attending a special U.N. Seminar. Being arranged for late October, the Seminar includes educational discussion activities and a tour of the U.N.

Also, as a follow through of these eight schools, the packets, movie, slide sets, etc., were made available to counties in case they choose to hold a meeting or have programs on the subject in a local area. To date the materials have been requested many times by local groups.

PROGRAMS INVOLVING ALL HOME ECONOMICS SUBJECT MATTER

Young Homemaker Classes

A series for young homemakers is offered in half the counties of the state in subjects of time and money management, clothing for children, foods and nutrition and home furnishings. The purposes are to help young women cope with limited resources, see the importance of their role in family stability and learn household skills. In addition, the young women are helped to see and explore relationships within their community.

The young homemakers are women under thirty and not over thirty-five. Certificates are presented to those completing the series of meetings and frequently they join homemaker clubs and

take part in other programs. These series are especially valuable to young mothers who are kept at home with small children.

The series are set up and organized by the County Extension Home Economist and county leaders and are taught by area agents and specialists responsible for the particular subject matter.

Training of Paraprofessionals

A new audience was reached by Extension specialists in 1971 and again in 1972 by a training conference on the Purdue campus for paraprofessionals who work with low-income and disadvantaged families in connection with social agencies of Indiana. These paraprofessionals are usually identified with the community where they are working and their schooling ranges from eighth grade to post high school. About 40% both years were black women.

Extension specialists and other selected Purdue faculty presented health, nutrition, money management, housing and furnishing, child care, clothing and similar topics in a way to help these aides in their contacts with families. Diet needs for the elderly and food for the pregnant woman and new mother were demonstrated and discussed. Understanding children and helping them dress at low cost was also included. Specialists in family economics featured management and wise use of money with all programs adapted to fit low income situations.

Since many attending had never before visited the Purdue campus, a tour was arranged. A class in home management and family economics conducted one session of the conference thus establishing a contact between Purdue students and the paraprofessionals. Time was allowed for attendance at an evening convocation program on campus, thus offering a cultural opportunity to those interested.

Feedback on an evaluation sheet indicated the women were most appreciative of the program content and prize their new relationship with Purdue. Last year several returned to attend Homemakers Conference in June and the same interest was expressed this year. About 20 of the paraprofessionals attended the training both years with a total of 145 different women being reached.

They represent agencies such as Economic Opportunity, Community Action programs, Public Welfare, Community Development programs, Urban Development, Urban League, and Visiting Nurses, most of whom do not staff a home economist for training the paraprofessional.

Independent Living

A project on Independent Living, directed toward Senior Citizens is being piloted in one area of the state beginning in April, 1972. The object is to provide educational programs, not service, to help senior citizens enhance later years by maintaining independence longer. Home Economics specialists will be involved. Plans are now in the formative stage as to specific subject matter involved.

Cultural and Related Arts

The arts program was initiated in the state Extension activities in 1969 by a committee composed of three staff members. In 1971 the Indiana Extension Homemakers Association appointed a state committee for the Cultural and Related Arts and 52 counties have named county chairmen.

Cooperating with the State Department of Public Instruction and the State Arts Commission, three area meetings and one state meeting have been held, involving teachers, artists, art organizations, civic and community leaders, and Extension homemakers. Other area meetings will be held as plans are formalized. The meetings are planned to give all groups concerned with the arts an opportunity to get together to talk over interests, to explore what is available in local communities, and discuss ways groups can help each other.

Programs of the performing arts and art appreciation are included in activities for Annual Homemakers Conference. Craft workshops, art appreciation lessons and tours to cultural centers are included in county activities.

Adult Education Class

Six Extension specialists in selected subject matter areas taught an eight week non-credit series on consumer education in Fall 1971, Indiana-Purdue University Campus, Indianapolis. The series entitled "How To Spend Dollars With Sense" emphasized techniques to help individual consumers and families sharpen buymanship skills to more effectively use their money.

Indiana Homemakers Conference

Approximately 1,800 women from the 92 Indiana counties attend the Annual Homemakers Conference. Nationally recognized speakers present a provocative program on issues that concern the family and its members as each interact at home, within the community, and in the total environment.

Uniquely, the conference serves as a model for program development for over 55,000 women in the state Extension Homemaker clubs.

Training for Home Economics Area Agents

Twice a year, specialists in each Home Economics subject matter area plan and conduct three-day in depth workshops to train Area Agents in their subject-matter specialty. Four times a year, specialists meet with their counter-part agents for one day training to catch up on new developments in their subject matter area. Training in program development is included in the Annual Extension Workers Conference.

Mass Media

The home economics Extension specialists in all subject matter areas prepare an average of two news releases per month. These are distributed in Indiana to 91 community newspapers, 61 daily papers, five farm papers and magazines and 68 radio and television stations. Over 350 news releases were distributed in the last twelve months.

All specialists contribute to "News Notes" sent monthly to all Family Living Agents. Foods specialists write for "Purdue's P.A. Pipeline" for Program Assistants working in the Expanded Foods and Nutrition program. "News Notes" is sent to all Federal Extension Home Economists and to other states as requested. About 30 states are now on the regular mailing list.

"Consumer Facts" Program

Twenty-two point-of-purchase one sheet leaflets have been prepared by home economics Extension specialists for general consumer distribution. Over 350,000 of these leaflets have been distributed since the start of 1972. Over one million of these publications have been distributed in the last five years.

These leaflets are unique in that they lend themselves to quick reading and answer specific consumer questions. Extension agents are encouraged to use them as an entre to non-extension oriented clientele.

Their use with this type of clientele creates an image of the local Extension office as a center for consumer information.